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Metandania tordi, a new stegocephalid (Crustacea: Peracarida: Amphipoda) species from the Southern Ocean

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Abstract.—A new stegocephalid (Amphipoda) species, *Metandania tordi* n.sp, is described, belonging to the subfamily Andaniexinae Berge & Vader 2001. The new species is the first record of the genus in the southern hemisphere. In addition, a morphological trait, previously not figured nor described within this family, is presented: a process proximally on the inner anterior surface of the fourth coxa. This locking-process is interpreted, and named accordingly, to enhance a relative stabilization of the third and fourth coxae. A brief comparison of the morphology of the fourth coxa between all five stegocephalid subfamilies is presented.

As part of an ongoing project aiming at a taxonomic revision of the Antarctic amphipod fauna (The Antarctic Amphipodologist Network), we were provided, from the collections of the Smithsonian Institution, with an extensive material of stegocephalids from the Southern Ocean. Among that material, was the first record of *Metandania* Stephensen, 1925 from the Southern Hemisphere, a genus previously only known from the North Atlantic. In addition to four other genera of the subfamily Andaniexinae Berge & Vader, 2001 (*Andaniexis* Stebbing, 1906, *Andaniotes* Stebbing, 1897, *Parandaniexis* Schellenberg, 1929 and *Stegosoladidus* Barnard & Karaman, 1987), this is the fifth genus within the subfamily to be recorded from the Southern Ocean.

Methods

This study is based upon material from the Smithsonian Institution. All dissected appendages were mounted in polyvinyl-lactophenol, stained with rose-bengal. These appendages were drawn using a Leica compound microscope equipped with a drawing-tube, while the habitus-drawings were made using a Leica dissecting microscope. Mature and immature females were distinguished from males by the presence of oostegites. The classification of setae and setae-groups follows that of Berge (2001a). All scales attached to the figures are 0.1 mm unless otherwise stated.

Specimens prepared for SEM, were first sonicated for 7 seconds in order to remove mucus and debris from their surface. Then they were dehydrated through a series of acetone, 10 minutes in each, ranging from 70% up to 100% acetone. Specimens were then dried in a critical point dryer, before mounted on a stub and coated with gold.

Pereopod 4 of the holotype was damaged during dissection and is thus not figured (but see description of the new species below). Uropods 1 and 2 are illustrated on the habitus drawing (Fig. 4) only.

Symbols: A1–2: Antenna 1–2; IP: Inner plate; L: Labium; LBR: Labrum; LMND:

Left mandible; MX1: Maxilla 1; MX2: Maxilla 2; MXP: Maxilliped; P1–7: Pereopods 1–7; PLP: palp; ST: Setal teeth on the first maxilla; T: Telson; U1–3: Uropods 1–3.

Results and Taxonomy

Locking-process on the fourth coxa: Found exclusively within the Andaniexinae, some of its genera possess a projection proximally on the inside of the fourth coxa (Fig. 1). This projection is found in the four genera *Andaniotes* Stebbing, 1897, *Glorandaniotes* Ledoyer, 1986 (but see also Berge & Vader 2003), *Metandania* Stephensen, 1925 and *Stegosoladidus* Barnard & Karaman, 1987, and is absent in the remaining three genera of the subfamily (see Table 1). Although its function has not been observed, it is interpreted to function as a locking-process between the third and the fourth coxa plates. In all stegocephalid genera, the coxae-shield, as formed by coxae 3 & 4, is hard and contiguous, whereas the first two coxae are, in many genera, more flexible and not contiguous. In e.g., *Andaniexis* Stebbing, 1906, coxae 1–4 do not form a continuous shield, and the first coxal plate is in addition very short. In e.g., *Andaniotes,* on the other hand, coxa 1 is long and deep with coxae 1–4 forming a hard and continuous shield. However, in both these genera, as in all other stegocephalid taxa, there is a conspicuous overlap between the third and the fourth coxae. This overlap is enhanced by the concave anterior margin of coxa four (covering almost the entire length of the coxa, see Fig. 1B), in which the posterior margin of coxa 3 fits in. As can be seen in Fig. 2, this concave anterior margin of coxa 4 is present in *Andaniexis lupus* Berge & Vader, 1997, but not, in contrast to *Andaniotes linearis* (Fig. 1), the specially derived "locking-process". Thus, it appears that the "locking-process" is an additional process on the already three-dimensional inner side of the coxal plate, enhancing a more stable and rigid coxal-shield. Figure 3 gives an overview of the corresponding traits in three of the other subfamilies (presence of the anterior concave margin, but absence of a "locking-process"). The condition within the last subfamily, the Parandaniinae Berge & Vader, 2001, is very much similar to that of *Andaniexis lupus* (Fig. 2).

Subfamily Andaniexinae Berge & Vader, 2001

Genus *Metandania* Stephensen, 1925

Metandania tordi, new species

Figs. 4–6

Holotype: Female, 8 mm. 55°00–03′S, 58°51–57′W, 4th of December 1962 on the Eltanin, cruise 6 station 350 (depth unknown). Collected with a Menzies Trawl.

Paratype: Male, 6 mm. 57°59′–58°00′S, 70°53′–71°00′W, 3rd of December 1962 on the Eltanin, cruise 5 station 311, depth 3911–4099 m. Collected with a Menzies Trawl.

Etymology: This species is named after the first author's son Tord Raddum Berge.

Diagnosis: *Metandania tordi* is separated from its congeners by the combination of 1) antennae 2 peduncle article 4 about as long as article 5, and 2) biarticulate outer ramus on the third uropod.

Description:

Head: Head retractable under pereonite 1. Rostrum rudimentary.

Antennae: Antenna 1 accessory flagellum shorter than flagellum article 1, uniarticulate. Antenna 2 peduncle article 3 short (Fig. 5 A2: only articles 3–5 of the peduncle figured), about as long as broad. Peduncle article 4 as long as article 5.

Epistome: Epistome laterally smooth. Epistomal plate (medial keel) produced and conspicuous.

Mouthparts: Mouthparts not elongate.

Mandibles with incisors transverse, partly toothed. Left lacinia mobilis present, strongly toothed and distally not produced.

Maxilla 1 palp articulation absent, distally with short robust setae. Outer plate distally rounded, ST in a 6/3 arrangement with

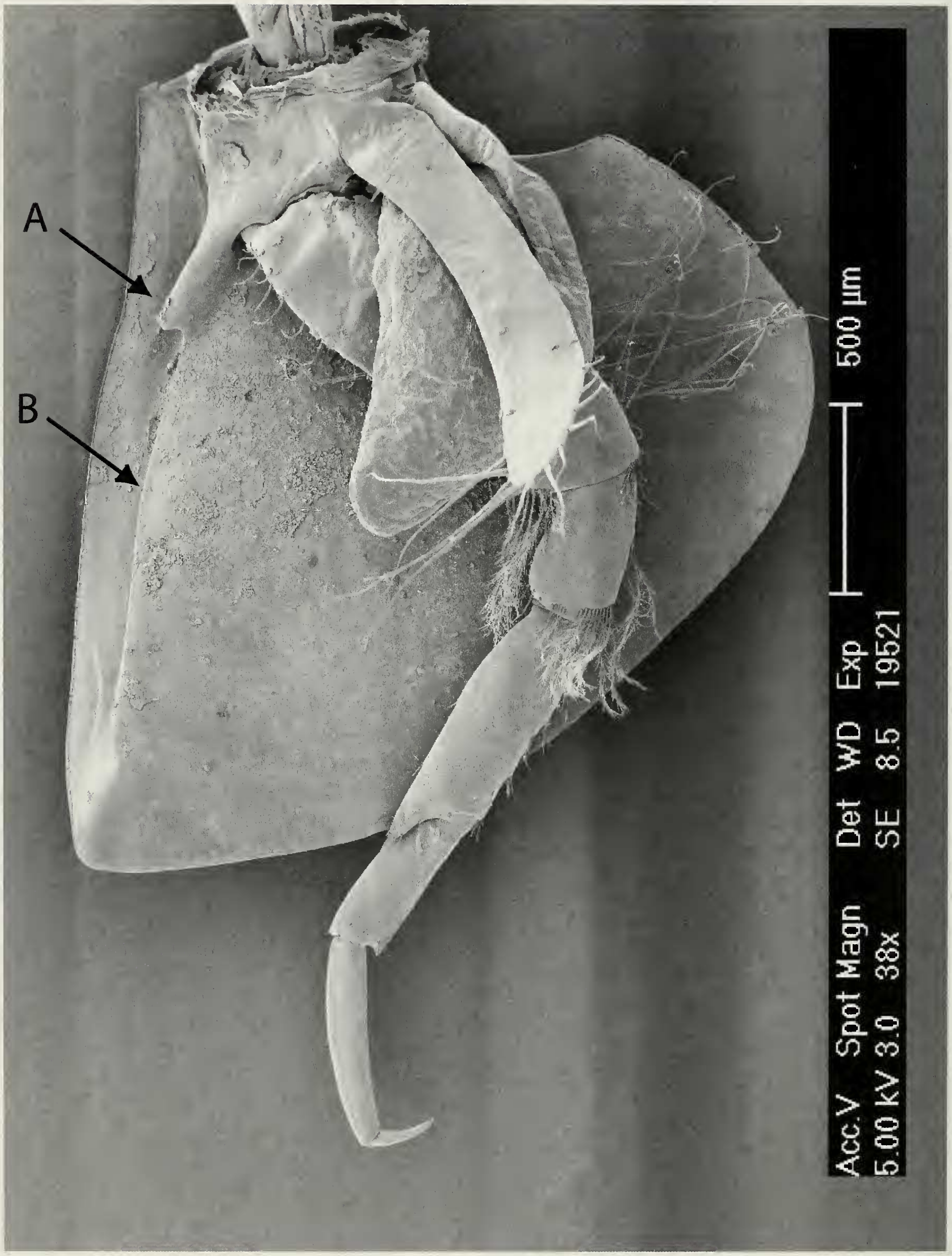

Fig. 1. *Andaniotes linearis* Barnard, 1932. Pereopod 4 with coxa, gill and oostegite: arrow indicating the locking-process on the inner anterior margin of the coxa. A: locking-process; B: anterior concave margin.

Table 1.—Overview of the morphology of coxa four among stegocephalid subfamilies, with special emphasis on the genera within the subfamily Andaniexinae. Classification follows that of Berge & Vader 2001.

	Coxae 1–4	Coxa 4 anterior margin	Locking-process
ANDANIEXINAE			
Andaniexis	not continuous	convex	absent
Andaniotes	continuous	convex	present
Glorandaniotes	continuous	convex	present
Metandania	continuous	convex	present
Mediterexis	not continuous	convex	absent
Paradaniexis	not continuous	convex	absent
Stegosoladidus	continuous	convex	present
ANDANIOPSINAE	not continuous	convex	absent
BATYSTEGOCEPHALINAE	continuous	weakly convex	absent
PARANDANIINAE	continuous	weakly convex	absent
STEGOCEPHALINAE	continuous	convex	absent

two parallel rows: First row with ST 1–5 present, ST 6 absent and ST7 present. Second row with ST A–C present. Inner plate with shoulder weakly developed, setae pappose.

Maxilla 2 outer plate not gaping and geniculate, setae distally straight. Inner plate with setae-rows A and B separated. Row B with the 3 first setae differentiated from the other setae. Row C present, row D absent.

Maxilliped palp 4-articulate, article 2 distally unproduced. Articles 1–3 with long plumose setae. Inner plate with inner corner weakly produced distally, 3 nodular setae present. Outer plate with inner and outer setae-row present, both with short simple setae. Distal setae-group absent.

Labrum about as long as broad, left lobe reduced.

Labium distally broad, distal finger absent.

Pereopods and coxae: Coxal plates and basis of the pereopods covered with short simple setae. Coxae 1–3 contiguous.

Pereopod 1 coxal plate about as deep as basis, basis anterior margin weakly expanded. Pereopod 1 propodus subovate, posteriorly without submarginal row of setae.

Pereopod 2 ischium not elongate, distal posterior margin with plumose setae. Propodus subrectangular.

Pereopod 3 basis anterior margin distally with short simple setae. Merus longer than carpus, anterior margin with short robust setae. Carpus subequal in length to propodus. Carpus and propodus anterior margins with short robust setae.

Pereopod 4 coxa locking-structure present. Basis without long setae, distally with plumose setae on anterior and posterior margins. Ischium with long plumose setae on distal posterior margin.

Pereopod 5 basis unexpanded, distal anterior and posterior margins with short simple setae. Merus longer than carpus, anterior margin with short robust setae. Carpus shorter than propodus. Carpus and propodus anterior margins with short robust setae.

Pereopod 6 basis posteriorly expanded, medially with a row of long plumose setae. Posterior margin of basis smooth.

Pereopod 7 conspicuously different from pereopod 6. Basis posteriorly serrate, medially with a row of short simple setae.

Oostegites and gills: Gills present on pereopods 2–7. Oostegites on pereopods 2–5.

Pleonites: Pleonites 1–3 dorsally smooth. Epimeral plate 3 weakly produced and rounded posteriorly, serrations absent.

Urosome: Articulation between urosomites 2 and 3 present. Uropod 1 rami with robust setae on outer and inner margin. Uropod 2 inner ramus with robust setae on outer and inner margin, outer ramus with robust setae on outer margin. Uropod 3 pe-

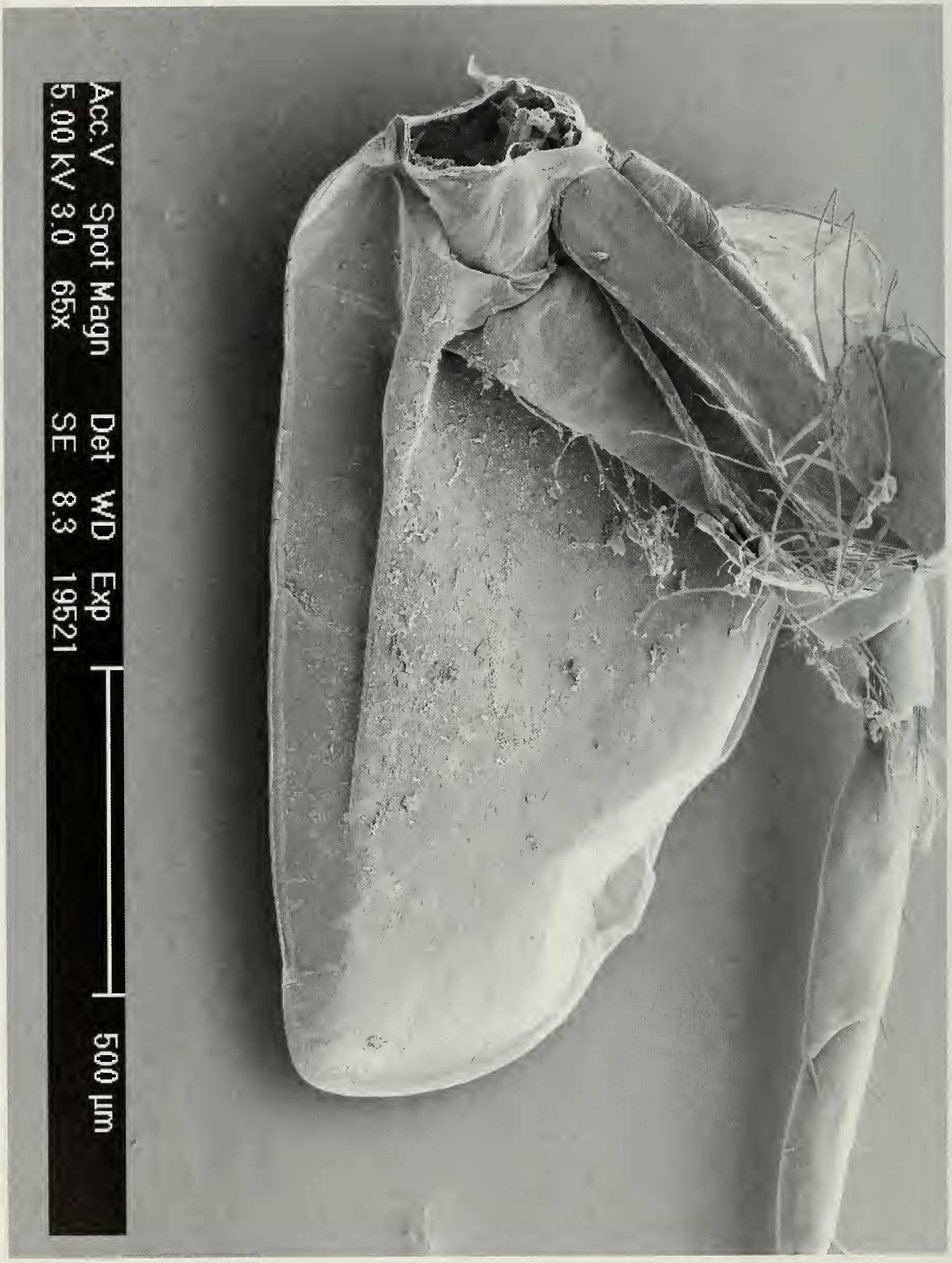

Fig. 2. *Andaniexis lupus* Berge & Vader, 1997. Pereopod 4 with coxa, gill and oostegite.

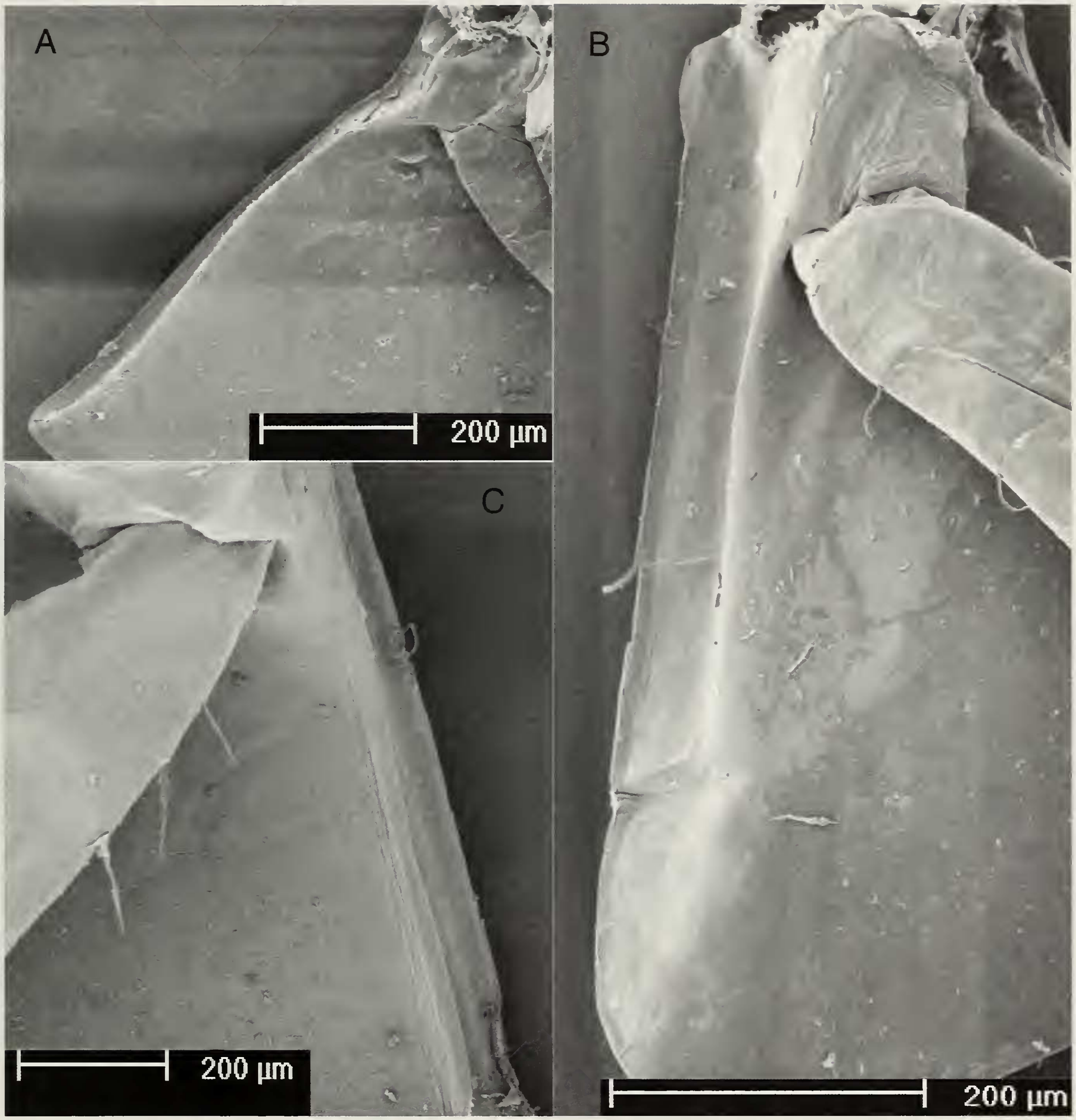

Fig. 3. A: *Tetradeion crassum* (Chilton, 1883), subfamily Stegocephalinae. Inner anterior margin of coxa 4; B: *Andaniopsis nordlandica* (Boeck, 1871), subfamily Andaniopsinae. Inner anterior margin of coxa 4; C: *Bathystegocephalus globosus* (Walker, 1909), subfamily Bathystegocephalinae. Inner anterior margin of coxa 4.

duncle longer than telson, outer ramus 2-articulate. Outer ramus with robust setae on outer margin, inner ramus with robust setae on outer and inner margins.

Telson cleft and rounded distally, submarginal setae on apex of each lobe present.

Males: No sexual dimorphism observed.

Remarks: This is the third species that is assigned to the genus *Metandania* since it was re-established as a valid taxon by Berge (2001b:825). Despite the taxonomical problems that still are associated (Berge 2001b:829) with its type species, *M. islandica,* (first of all there are reasons to doubt that the two recognized specimens in fact belong to the same species), the genus appears as a morphologically closely related group. Especially the morphology of the left mandible is a feature that links the three

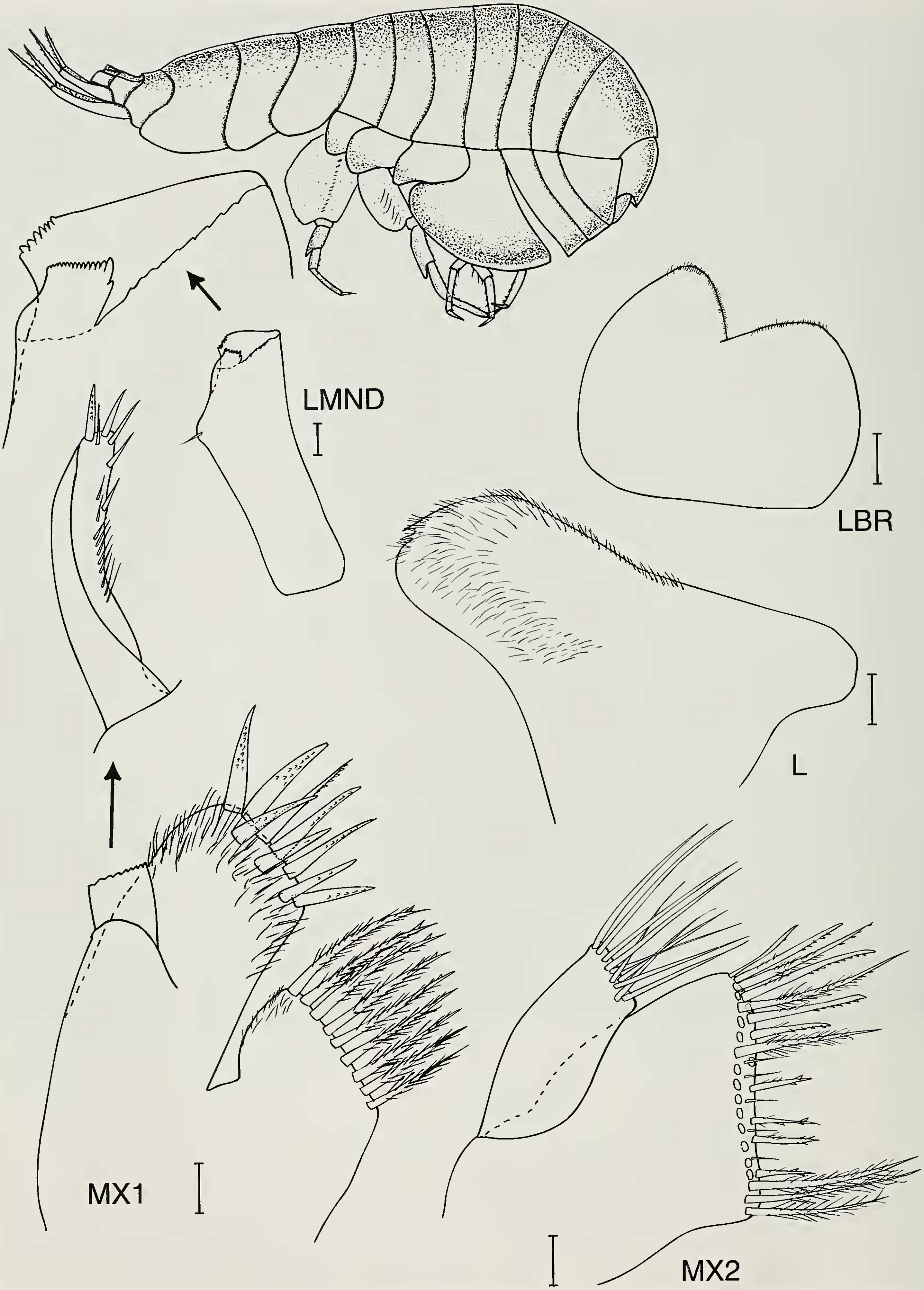

Fig. 4. *Metandania tordi* n.sp. Holotype.

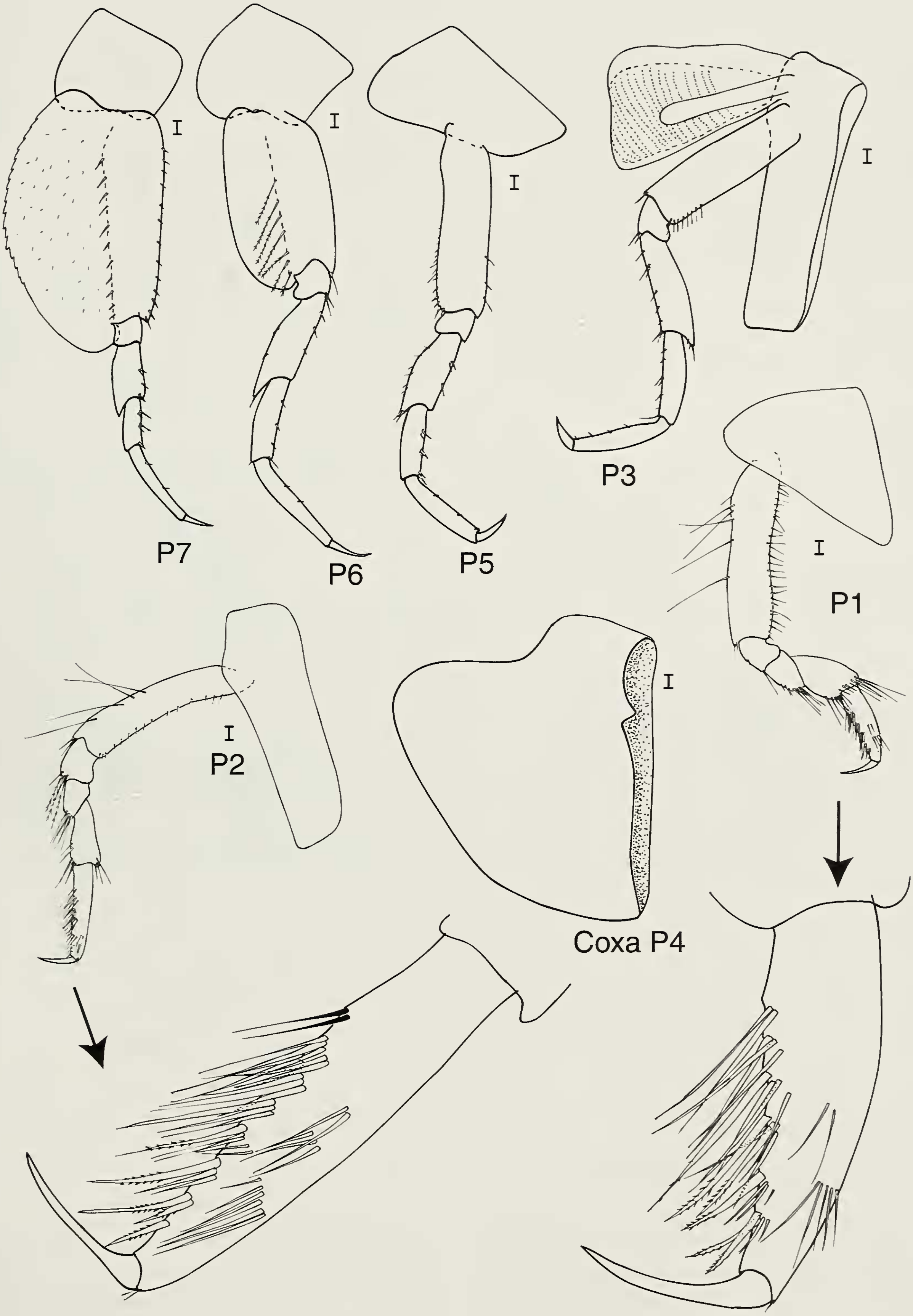

Fig. 5. *Metandania tordi* n.sp. Holotype.

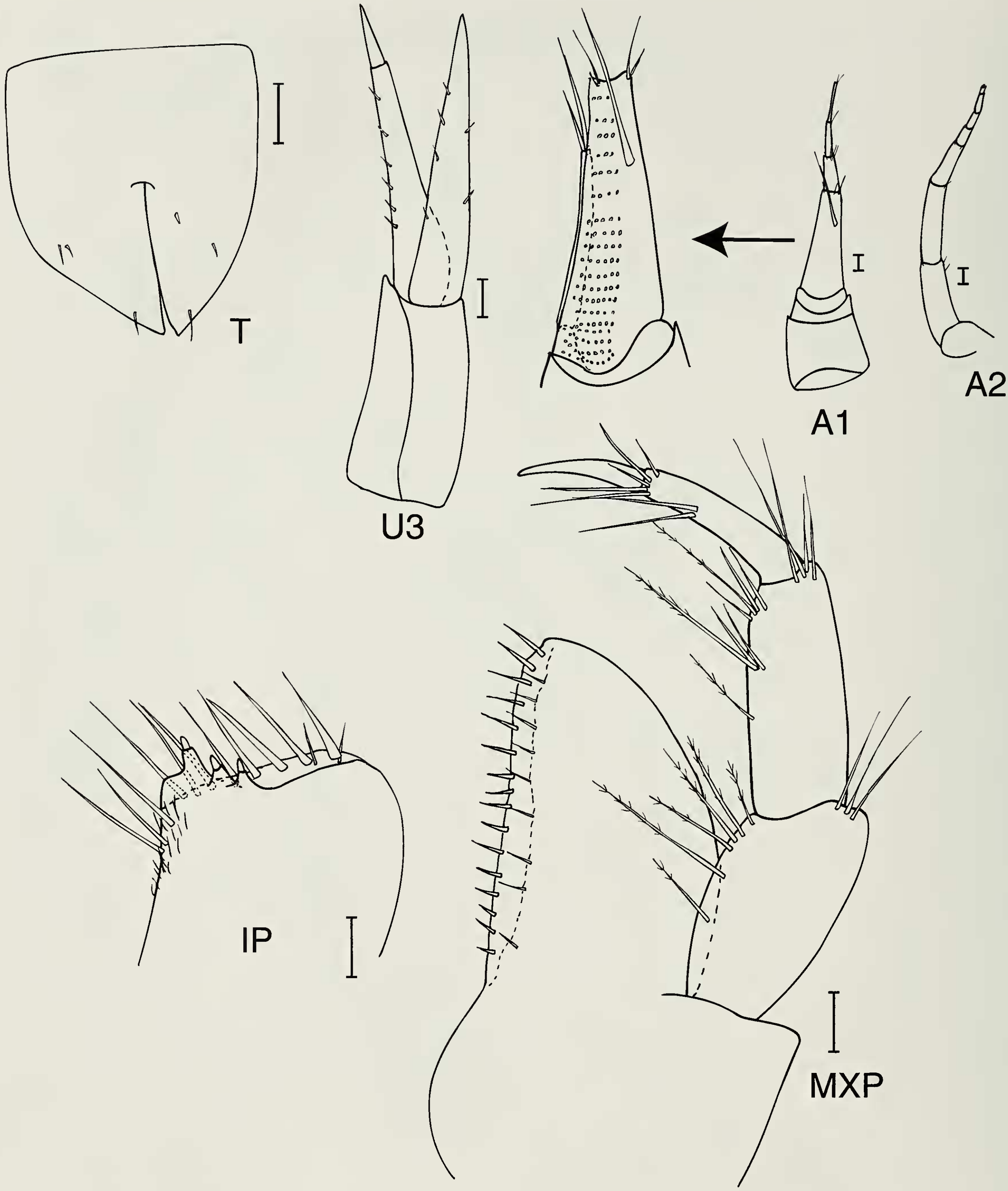

Fig. 6. *Metandania tordi* n.sp. Holotype.

recognized taxa together: the incisor is transverse and smooth, but toothed distally on the inner corner. Also the lacinia mobilis is toothed and much stronger than the typical character state otherwise found in the subfamily Andaniexinae. The present species is thus a typical member of its genus, possessing all the characteristics of the mandible as described above. Furthermore, it has a long and cleft telson, uni-articulate palp of the first maxilla and laterally smooth (vs. produced) epistome, all character states that are diagnostic for the genus.

Acknowledgments

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